

REMARKS

Applicant respectfully requests reconsideration and allowance of claims 1-14 that are pending in the above-identified patent application.

In numbered paragraphs 1 and 2, the Examiner provisionally rejected claims 1-14 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3, 13-17 and 28-29 of co-pending Application No. 10/233,725. Applicant submits that U.S. Patent Application No. 10/233,725 has issued as U.S. Patent No. 6,777,898. Thus, in anticipation of the Examiner removing the provisional status of this obviousness-type double patenting rejection, Applicant submits herewith a Terminal Disclaimer in order to overcome the obviousness-type patenting rejection.

In numbered parts 3-4 of the Office Action, the Examiner rejected claims 1-14 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,342,769 (“the *Birkestrand* reference”). Applicant respectfully traverses the Examiner’s rejection.

Independent claims 1 and 7 of the instant application recite converting “kinetic energy of the polyphase motor into operating power for the control circuit when the level has fallen below a threshold level, such that the control circuit is capable of maintaining synchronization with the polyphase motor.” Applicant submits that the above-quoted features of independent claims 1 and 7 are neither disclosed nor suggested by the *Birkestrand* reference.

The Examiner contends that the *Birkestrand* reference discloses “means for converting kinetic energy of the motor into power which is supplied to the control circuit when the level of the voltage in the power supply has fallen below a threshold level in order to maintain synchronization with the motor when working with a synchronous machine, see column 9 lines 48-67, column 10 lines 1-55, and column 11 lines 12-61.” Applicant submits that the Examiner has incorrectly interpreted the *Birkestrand* reference, particularly the cited portions thereof.

As an initial matter, the *Birkestrand* reference discloses a system of regeneration that is asynchronous; that is, it does not require synchronization with the rotor position of the polyphase motor 44a. Indeed, maintaining synchronization with the rotor position of the polyphase motor 44a is irrelevant to the system in the *Birkestrand* reference and is not disclosed thereby.

Further, column 10, lines 28-38, of the *Birkestrand* reference read as follows:

When the motor operates in the fourth quadrant, the required current build up in the stator inductance is produced by shorting out the stator windings for a period with a short circuit produced by switch 188 that is naturally commutated by the back EMF operating through a six-pulse rectifier consisting of the three anti-parallel diodes 168 across the high side switches 164, plus the three additional diodes 192 placed in series with the regeneration switch 188. When this short is released by switch 188, the current built up in the stator winding W inductance adds voltage to the back EMF producing a voltage that exceeds the DC voltage, resulting in regenerative current flowing to the DC source 51.

Notably, the *Birkestrand* reference teaches that the back EMF from the motor 44a is used to produce regenerative current into the DC source 51 when the motor operates in the fourth quadrant. The reference does not, however, disclose that the kinetic energy of the polyphase motor is converted into operating power for the sensorless commutation logic module 172 such that the logic is capable of maintaining synchronization with the polymotor 44a. At column 11, lines 43-56, the *Birkestrand* reference states:

As shown in FIG. 9, controller 50 also incorporates a voltage monitoring circuit 208 connected to battery 51. If the battery voltage falls too low indicating a discharge condition, or if that voltage rises too high indicating an over-charged condition, monitor circuit 208 will apply a corresponding signal to the control input 185a of torque limiting circuit 185. Thereupon, circuit 185 will reduce the torque command signal from circuit board 93 (FIG. 7) by a selected amount, e.g. one half, thereby reducing the torque commanded by control 54 by the same amount. This will limit the rate of discharge of battery 51 if the system is in it is motoring mode of operation, and the rate of battery charge if the system is in it generating mode. Preferably, monitor 208 has sufficient hysteresis to prevent undesirable oscillation of its output signal to circuit 185.

Notably, the above quoted section of the *Birkestrand* reference discloses that the motor 44a is placed into a regeneration mode in order to increase the charge on the battery 51 if the battery voltage falls too low. This, does not, however, disclose that the kinetic energy of the motor 44a is converted into operating power for the sensorless commutation module 172 such that it is capable of

maintaining synchronization with the motor 44a.

Applicant also notes that the *Birkestrand* reference does not disclose “boosting the back-emf in order to produce the operating voltage for the control circuit” at column 10, lines 28-38 as the Examiner contends. Indeed, that section, quoted above, merely discloses “[w]hen this short is released by switch 188, the current built up in the stator winding W inductance adds voltage to the back EMF producing a voltage that exceeds the DC voltage.” This is not boosting the back EMF to produce the operating voltage for the control circuit. Thus, claim 4 is distinguishable over the *Birkestrand* reference.

In view of the foregoing, Applicant submits that the *Birkestrand* reference fails to disclose the above quoted features of independent claims 1 and 7 of the instant application. Accordingly, Applicant respectfully requests that the Examiner withdraw the § 102(e) rejection of the subject independent claims. Further, dependent claims 2-6 and 8-14 depend from independent claims 1 and 7, respectively, and contain all of the limitations thereof as well as other limitations that are neither disclosed nor suggested by the *Birkestrand* reference. Accordingly, Applicant submits that subject dependent claims are likewise patentable.

In numbered parts 5-6 of the Office Action, the Examiner rejected claims 1, 5, and 7 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,889,629 (“the *Patton* reference”). Applicant respectfully traverses the Examiner’s rejection. Independent claims 1 and 7 of the instant application require monitoring “a level of a power source that provides operating power to a control circuit, the control circuit being of a type that senses signals in windings of a polyphase motor to maintain synchronization therewith . . .” Applicant submits that the *Patton* reference fails to disclose or suggest the above quoted features of independent claims 1 and 7.

First, the *Patton* reference fails to disclose that the voltage of the microcontroller and memory 24, i.e., VCC, is monitored for falling below a threshold. Rather, the *Patton* reference discloses that the power-fail detector 46 monitors the host DC power level 50. The host DC power level 50 provides the high voltage source for the spindle motor 30 through the diode 48. (See FIGS. 1-2). The host DC power level 50 is not the same power source as VCC and is not a “power source that provides operating power to a control circuit” as recited in claims 1 and 7 of the instant

application. Second, the *Patton* reference fails to disclose that the microcontroller and memory 24 and/or the spindle driver 22 are of a type that sense signals in windings of a polyphase motor to maintain synchronization therewith. Details of the spindle driver 22 are described at column 4, line 53 through column 5, line 5 of the *Patton* reference. Nowhere in that section or any other section of the *Patton* reference is the concept of sensing signals of the motor 30 to maintain synchronization disclosed. In view of the foregoing, Applicant submits that the *Patton* reference fails to disclose the above quoted features of independent claims 1 and 7 of the instant application. Accordingly, Applicant respectfully requests that the Examiner withdraw the § 102(b) rejection of the subject independent claims. Further, dependent claims 2-6 and 8-14 depend from independent claims 1 and 7, respectively, and contain all of the limitations thereof as well as other limitations that are neither disclosed nor suggested by the *Patton* reference. Accordingly, Applicant submits that subject dependent claims are likewise patentable.

In numbered parts 7-8 of the Office Action, the Examiner rejected claims 2-4, 6, and 8-14 under 35 U.S.C. § 103(a) as being unpatentable over the *Patton* reference in view of U.S. Patent No. 5,990,643 (“the *Holling* reference”). Applicant respectfully traverses the Examiner’s rejection.

As an initial matter, Applicant submits that claims 2-4, 6, and 8-14 are patentable over the *Patton* reference in view of the arguments presented hereinabove. Additionally, however, Applicant respectfully submits that the Examiner’s conclusion as to the combination of the *Patton* and *Holling* references is incorrect. Even if the teachings of the *Patton* and *Holling* references may be properly combined (which Applicant does not concede), the resultant combination would not disclose monitoring “a level of a power source that provides operating power to a control circuit . . . and converting kinetic energy of the polyphase motor into operating power for the control circuit when the level has fallen below a threshold . . .” Indeed, as discussed above, the *Patton* reference fails to disclose that the voltage VCC is monitored for falling below a threshold. Rather, the power-fail detector 46 monitors the host DC power level 50, which does not provide operating power to the microcontroller and memory 24.

Accordingly, Applicant respectfully requests that the Examiner’s § 103(a) rejection of claims 2-4, 6, and 8-14 be withdrawn.

Application No. 10/766,719

Attorney Docket No. 510/3X2

Applicant therefore respectfully requests reconsideration and allowance in view of the above remarks. In the event there are any fees due and owing in connection with this matter, please charge same to our Deposit Account No. 11-0223.

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Respectfully submitted,

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